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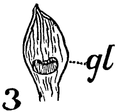
BOTANY.[1]

NOTES ON THE STRUCTURE OF THE FLOWERS OF ZYGADENUS GLAUCUS NUTT.—The plant is found in low prairie lands near Dayton; it arises from a coated bulb, the last one or two leaves of which subtend buds that are to form the bulbs of next year. In addition to these bulbs the plant sometimes puts forth a short stem scarcely an inch long at the end of which a bulb and roots are developed. This stem originates in the parent bulb, but just where, I neglected to determine. The flowers are borne in panicles, are nearly erect, and permit the insect visitors to walk easily about on the leaves of the greenish-white perianth, sipping the excretion from the obcordate green glands (Fig. 3). The excretion had a disagreeable taste, and was not sweet. The open nature of the flower would suggest the visits of chiefly diptera, and such were the only visitors I saw. In the bud, stamens and styles are erect. The anthers are heart-shaped, confluently one-celled and extorse. The three outer stamens mature first, then the three inner stamens, recurving until the anthers face the glands (Fig. 1). After dehiscence the stamens again assume an erect position and the styles begin to grow in size and recurve until the stigmas assume the positions first held by the anthers (Fig. 2). There is no provision made for the protection of the gland excretion. The first rain could wash it away. All insects can readily get at it. But the disagreeable taste is sufficient to keep away most unwelcome visitors. Bees seem to evade it for better plants and probably the taste of the nectar adapts this plant as perfectly to flies as the more complicated structures do to higher insects. The unsightly colors are also noticeable in this respect.—*Aug. F. Foerste, Granville, Ohio.*



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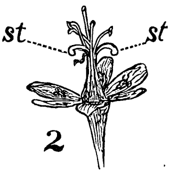

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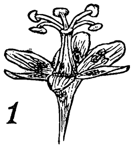

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FIG. 1.—Male state of flower, natural size, with the stamens recurved. FIG. 2.—Female state of flower, the stamens now erect, and the three stigmas, *st*, recurved. FIG. 3.—Upper surface of a perianth leaf (slightly enlarged) showing a gland at *gl.*

CONCERNING THE MANNER IN WHICH SOME SEEDS OF GRASSES BURY THEMSELVES IN THE SOIL.[2]—You are doubtless all more or less familiar with the experiments of Francis Darwin and a few others before him on the power of seeds of Stipa, Erodium, Heteropogon, Avena, and other plants to bury themselves beneath the surface of the soil. Mr. Darwin's account is the best, and can be found in the transactions of the Linnean Society for 1876

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[1] Edited by PROFESSOR C. E. BESSEY, Lincoln, Nebraska.

[2] Read before the Botanical Club of the A. A. A. S.

When dry, the awns of these seeds or fruits twist about, leaving a considerable portion of the untwisted part of the awn at the tip spread out at nearly right-angles to the rest of the awn. If wet, the awn untwists and becomes straight. The apex is sharp, and is usually supplied with short, stiff hairs, which act as barbs to a spear, and help hold all that is gained as the apex pushes or bores forward. These seeds usually fall to the ground among straws, stubble, and more or less rubbish. If the awn is held in place, the motion takes place in the grain.

Some years ago in repeating this experiment, I placed a box of earth full of small sticks or straws every inch or so over the surface. This was to act as stubble, and by holding the awn, help the seeds to penetrate the ground. The seeds worked well, some of them (*Stipa spartea*) boring down two inches to the bottom of the box.

Later I tried some in a box of earth without any straws or sticks, and was surprised to find that they all but one, in fifty or more, had no trouble in penetrating the soil. The seeds of some species penetrate the skins of sheep and dogs and become quite troublesome. I have recently been studying the grain of three species of grass with reference to this subject.

After dry weather where some tall oat-grass (*Arrhenatherum avenaceum*) had gone to seed before it was cut, the land in places had cracked in drying. There was considerable litter among the plants on the ground. It was very interesting to see that the seeds had nearly all twisted their way down under this litter of straws, dead leaves and other rubbish. Every little hole and crack in the dried earth was stuck full of these seeds with the base end down bringing the embryo farthest into the ground. Some of the seeds had gone down an inch or so into the cracks.

On the last of July we had some days of wet weather which caused the cracks in the soil to close up against the seeds; the pattering drops of rain scattered more or less earth into the holes and cracks over the seeds and they began to grow freely.

Large quantities of seeds of *Anthoxanthum puelli*, a species of small sweet vernal, behaved just as well as those of oat-grass. They found the cracks and crevices; the litter served as a mulch; the seeds started to grow. In a thin place on the lawn some seeds of *Danthonia spicata* were observed. They bored down as well as those of the two former plants, but in this case large numbers of ants were busy in their excavations, thus making small hills, usually not more than an inch high and three inches in diameter. Numerous seeds of Danthonia were already sprouting and the young plants were coming out of the fresh earth where they had buried themselves or had been buried by the ants. Numerous mole hills in the vicinity might also have served as newly prepared ground for these seeds, had the plants grown just there.

A few weeks ago, some boxes were half-filled with good garden soil. The surface seemed quite even, though there were some small lumps half an inch or more in diameter, and a few irregular, narrow depressions here and there. On the soil were scattered in the several boxes, seeds in the chaff of the three grasses named. There were no artificial obstructions placed in the soil, which was alternately wet and dried quite a number of times, till nearly all the seeds disappeared below the surface and some of them, even when the surface was quite dry, began to send up green leaves. Thus we see that even the weak and short twisting awns of some grasses are of use in covering the seeds with soil.—*Dr. W. J. Beal, Agricultural College, Mich.*

NEW SPECIES OF NORTH AMERICAN FUNGI (*Continued*).—*Phyllosticta leucothöes.*—Apical portion, or often the entire upper half of the leaf discolored, rusty brown, the discolored part distinctly limited. Perithecia globose 150–200μ in diam., few and scattered, buried in the substance of the leaf, their apices slightly prominent above, but covered by the epidermis; spores ovate-oblong, 15–21 × 6–7μ, granular or with 2–3 nuclei. Differs from *P. terminalis* E. and M., to which it bears a general resemblance in the different color of the affected part and in its much larger spores. On leaves of *Leucothöe acuminata.* Green Cove Springs, Fla., January, 1884.

Phyllosticta sinuosa.—Spots orbicular, 1.5–6$^{\text{mm}}$ (mostly 2–3$^{\text{mm}}$), reddish-brown, becoming nearly white with a distinct raised, reddish-black border; perithecia epiphyllous, scattered, lenticular (150μ) mostly near the margin of the spots; spores oblong or clavate-oblong, hyaline, 3½μ (undeveloped)?–15μ and 1½–2μ wide. On leaves of *Olea americana.* Green Cove Springs, Fla., February, 1884.

Phyllosticta corylina.—Spots red-brown, round (2–5$^{\text{mm}}$) or oftener coalescing and continuous along the edge of the leaf, perithecia brown-black, erumpent, lenticular, amphigenous (90–120) on very short basidia; spores subhyaline, oblong, mostly with a nucleus in each end, 12–15 × 6–7μ. This appears to differ from *P. coryli* S. and S. and from *P. corylaria* Sacc. in its larger spores and the different character of the spots. On leaves of *Corylus americana.* Newfield, N. J., August, 1884.

Phyllosticta apocyni.—Epiphyllous on brown, round definitely limited spots (1–2$^{\text{mm}}$), with a slightly raised narrow border; perithecia subglobose, erumpent, mostly in the center of the spots, 75 diam., spores globose or ovate, 7–9μ with granular contents, larger than those of *P. asclepiadearum* West. On leaves of *Apocynum cannabinum.* July.

Sacidium polygonati.— Perithecia flattened, globose or elliptical, 200–230μ in diameter; astomous, of compact, subradiate cellular structure; spores subglobose or subangular by compression, 5–7μ. On dead stems of *Polygonatum giganteum.*—*J. B. Ellis, Newfield, N. J., and Dr. Geo. Martin.*

THE DEATH OF GEORGE BENTHAM.—This eminent man, whose name is familiar to every botanist, died on the 10th of September at his home in London, England, at the advanced age of eighty-four years. He was born at Plymouth, September 22, 1800. The years from 1814 to 1826 were spent in southern France, a result of which was his first botanical publication, a Catalogue of Plants Indigenous to the Pyrenees and Bas Languedoc, issued in 1826. In 1854 his great herbarium and library were given to Kew, and here he worked assiduously upon genera and orders of plants, the results of which appeared from time to time in the form of unrivaled monographs. The greatest work of his life was that upon the Genera Plantarum, began in 1862 and completed in 1883, the joint product of Mr. Bentham and Sir Joseph Hooker.

NOTICE.—CHANGE OF ADDRESS.—The editor of this department having accepted the chair of botany and horticulture in the University of Nebraska, should hereafter be addressed at Lincoln, Nebraska.

BOTANICAL NOTES.—Dr. Vasey has again placed the botanists of the country under obligations to him by bringing out a thick pamphlet entitled The Agricultural Grasses of the United States. A proper notice will be given of it in the future, but we must stop long enough to commend this as a sample of the kind of publications which are creditable to the department of agriculture. Unfortunately many of its publications have been far from creditable.——In recent numbers of the *Gardener's Chronicle* Thos. Meehan publishes a valuable article on the fertility of hybrids, from which we hope to be able to make extracts at an early date. ——In the same journal for September 27, W. G. Smith gives an account of the growth of the little fungus *Schizophyllum commune* upon the cut edge of ensilage in a silo. This is surely an odd place for it to grow, but it sounds oddly to learn that "the fungus is a common one in the tropics, rarely spreading into temperate regions." It is, as every collector well knows, one of our most common fungi the year round, growing upon sticks and timber everywhere.——The Ninth Annual Report of the Montreal Horticultural Society contains an interesting paper by Professor Penhallow on the trees and shrubs of northern Japan.—— The September *Torrey Bulletin* contains a paper by J. H. Redfield, giving the known localities of *Corema conradii*, from which it appears that it occurs upon the (1) New Jersey pine barrens, (2) upon Long Island, (3) at Plymouth, Mass., (4) Bath, Me., (5) Isle au Haut, Me., (6) Nova Scotia and Newfoundland, (7) Shawangunk mountains, N. Y.——In the same number is a convenient list, by A. F. Fœrste, of the changes in nomenclature as they occurred in Gray's Synoptical Flora, Vol. I, part II. There are about a hundred changes, but it does not follow that "about one-fourth of the species are to receive different names," as the writer of the paper remarks, for by a strange slip of memory the volume is said to enumerate "less than 400 monopetalous [sic] species from Caprifoliaceæ to Compositæ inclusive." The Compositæ alone include nearly four times that number!

ENTOMOLOGY.

GREAT SWARMS OF A PSEUDO-NEUROPTEROUS INSECT IN JAPAN.—On the 17th February of this year (1878), at about 7 o'clock A.M., this curious kind of insect (in the bottle) was seen at Yunosawa, in the district of Kameda, near Hakodate port, flying in swarms of so great numbers that for the distance of about four or five chios (1440 to 1800 feet) it seemed quite dark. At this time they were very small and looked like gnats or mosquitos. But about one hour afterwards they seemed to grow as big as a small sort of fly, and each pair copulated together for several hours, and then they all fell down dead.

This insect was also seen on the 29th December last year (1877). The residents of that place stated that they had never seen any before there, even in summer, and they considered it very strange that such insects were found there in the season of snow, especially during this severe winter.

Yunosawa is situated in a small valley. A small stream runs through this valley, and at its bank there is a lime manufactory, besides only one farmer's house, and a few rice fields, also a hot spring in this valley.

I have the honor to request you will be kind enough to examine the accompanying specimens of some curious insects lately found at Yunosawa, and shall be glad if you can give me some information regarding them.—*Aritake Yutaka*, *Kaitaku Wosakwau.*

[The insects were sent to Dr. Hagen who pronounced them a species of Capnia.—*Ed.*]

THE LARVAL STAGES OF M'AMESTRA PICTA.—In the middle ot September, 1876, the caterpillars of this moth did extensive injury to the ruta bagas on the farm of the Massachusetts Agricultural College at Amherst; eight years previous they also destroyed the leaves of this vegetable as well as the beet. The following descriptions may be of service as data for a comparative study of the early stages of the Noctuidæ:

Larva before the 1st moult.—Length $4^{mm.}$ Head as wide as the body, pale-greenish; body pale-greenish with a double dark livid dorsal stripe divided by a pale median line; three lateral dark stripes, of which the uppermost is the narrower; five pairs of abdominal feet, first pair one-half the size of the fourth pair. Body well tuberculated, being smoother in the adult.

Larva after the 1st moult.—Length $7^{mm.}$ Markings much as in the full-grown larva, deep yellow with a broad black dorsal band,